

AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior listings of claims in the present application.

What is claimed is:

1. (withdrawn) An electro-static discharge protection device comprising: a first conductive type well and a second conductive type well which are formed in a surface of the first conductive type layer or a first conductive type substrate; a first high concentration second conductive type region, a first high concentration first conductive type region, and a second high concentration second conductive type region which are formed in a surface of said second conductive type well; and a third high concentration second conductive type region which is formed in a surface of said first conductive type well, wherein said first high concentration second conductive type region and said first high concentration first conductive type region are connected with a first power supply of a potential, said third high concentration second conductive type region is connected with a second power supply having a potential different from the potential of said first power supply, and said second high concentration second conductive type region is set to a potential different from said first power supply.

2. (withdrawn) An electro-static discharge protection device comprising: a first conductive type layer or a first conductive type substrate; a first well of a first conductive type and a second conductive type well which are formed adjacent to each other in a surface of said first conductive type layer or said first conductive type substrate; a second well of the first conductive type which is formed in the surface of said first conductive type layer or said first conductive type substrate;

a first high concentration second conductive type region, a second high concentration second conductive type region and a first high concentration first conductive type region, which are formed in a surface of said second conductive type well; a third high concentration second conductive type region which is formed in a surface of said first well of the first conductive type; and a second high concentration first conductive type region which is formed in a surface of said second well of the first conductive type, wherein said first high concentration second conductive type region and said first high concentration first conductive type region are connected with a first power supply of a potential, said third high concentration second conductive type region and said second high concentration first conductive type region are connected with a second power supply having a potential different from the potential of said first power supply, and said second high concentration second conductive type region is connected with a trigger current supply circuit.

3. (withdrawn) The electro-static discharge protection device according to claim 2, wherein said trigger current supply circuit has a MOS transistor connected between said second high concentration second conductive type region and said second power supply.

4. (withdrawn) The electro-static discharge protection device according to claim 2, wherein said trigger current supply circuit has diodes connected between said second high concentration second conductive type region and said second power supply.

5. (withdrawn) The electro-static discharge protection device according to claim 2, wherein said first high concentration first conductive type region and said third high concentration second

conductive type region are arranged adjacent to each other.

6. **(withdrawn)** The electro-static discharge protection device according to claim 2, wherein said second high concentration second conductive type region and said third high concentration second conductive type region are adjacent to each other.

7. **(withdrawn)** The electro-static discharge protection device according to claim 2, wherein each of said first high concentration second conductive type region and said second high concentration second conductive type region comprises a plurality of divisional regions, each of said plurality of division regions of said first high concentration second conductive type region and each of said plurality of division regions of said second high concentration second conductive type region are alternately arranged in a direction orthogonal to a direction of arrangement of said second high concentration first conductive type region and said third high concentration second conductive type region, and said first high concentration first conductive type region extends between every two of said plurality of division regions.

8. **(withdrawn)** The electro-static discharge protection device according to claim 2, wherein said first high concentration second conductive type region are separated into two divisional regions which are arranged separately in a direction orthogonal to a direction of arrangement of said second high concentration first conductive type region and said third high concentration second conductive type region, said second high concentration second conductive type region is arranged between the two divisional regions of said first high concentration second conductive type region, and said first high concentration first conductive type region extends between each

of the two divisional region of said first high concentration second conductive type region and said second high concentration second conductive type region.

9. (withdrawn) The electrostatic discharge protection device according to claim 2, wherein said third high concentration second conductive type region is separated into two divisional regions which are separately arranged in a direction orthogonal to a direction of arrangement of said second high concentration first conductive type region and said third high concentration second conductive type region, said second conductive type well extends between the two divisional regions of said third high concentration second conductive type region, and said second high concentration second conductive type region is arranged in an extended region of said second conductive type well.

10. (withdrawn) The electro-static discharge protection device according to claim 2, wherein each of said first high concentration second conductive type region and said third high concentration second conductive type region is separated into two divisional regions which are arranged separately in a direction orthogonal to a direction of arrangement of said second high concentration first conductive type region and said third high concentration second conductive type region, said second conductive type well extends between the two divisional regions of said third high concentration second conductive type region, said second high concentration second conductive type region is arranged in an extended region of said second conductive type well, and said first high concentration first conductive type region extends between the two divisional regions of said first high concentration second conductive type region.

11. (withdrawn) The electro-static discharge protection device according to claim 2, wherein said first high concentration second conductive type region is separated into two divisional regions which are arranged separately in a direction orthogonal to a direction of arrangement of said second high concentration first conductive type region and said third high concentration second conductive type region, said first high concentration first conductive type region has a notch portion in its center in a division direction of said first high concentration second conductive type region on a side of said third high concentration second conductive type region, and said second high concentration second conductive type region is arranged at the notch portion.

12. (withdrawn) An electro-static discharge protection device comprising: a first conductive type well and a second conductive type well which are formed in a surface of a first conductive type layer or a first conductive type substrate; a first high concentration second conductive type region, a first high concentration first conductive type region and a second high concentration second conductive type region which are formed in a surface of said second conductive type well; and a third high concentration second conductive type region and a third high concentration first conductive type region which are formed in a surface of said first conductive type well, wherein said first high concentration second conductive type region and said first high concentration first conductive type region are connected with a first power supply of a potential, said third high concentration second conductive type region is connected with a second power supply of a potential different from the potential of said first power supply, and said second high concentration second conductive type region and said third high concentration first conductive type region are connected through a diode.

13. (withdrawn) An electro-static discharge protection device comprising: a first conductive type layer or a first conductive type substrate; a first well of a first conductive type and a second conductive type well which are formed adjacent to each other in a surface of said first conductive type substrate or said first conductive type layer; a second well of the first conductive type which is formed in the surface of said first conductive type layer or said first conductive type substrate; a first high concentration second conductive type region, a first high concentration first conductive type region and a second high concentration second conductive type region which are formed in a surface of said second conductive type well; a third high concentration first conductive type region and a third high concentration second conductive type region which are formed in a surface of said first well of the first conductive type; and a second high concentration first conductive type region which is formed in a surface of said second well of the first conductive type, wherein said first high concentration second conductive type region and said first high concentration first conductive type region are connected with a first power supply of a potential, said third high concentration second conductive type region and said second high concentration first conductive type region are connected with a second power supply of a potential different from the potential of said first power supply, and said second high concentration second conductive type region and said third high concentration first conductive type region are connected through a diode.

14. (withdrawn) The electro-static discharge protection device according to claim 13, wherein said third high concentration second conductive type region is separated into two divisional regions which are separately arranged in a direction orthogonal to a direction of arrangement of

said second high concentration first conductive type region and said third high concentration second conductive type region, said second conductive type well extends between the two divisional regions of said third high concentration second conductive type region, said second high concentration second conductive type region is arranged in an extended region of said second conductive type well, said third high concentration first conductive type region is separated into two divisional regions which are arranged outside an opposing region of said first high concentration first conductive type region and said third high concentration second conductive type region.

15. (withdrawn) The electro-static discharge protection device according to claim 14, wherein said second conductive type well extends to a back of an opposing region of said divisional regions of said third high concentration first conductive type region and said second high concentration second conductive type region.

16. (withdrawn) The electro-static discharge protection device according to claim 12, wherein said second high concentration second conductive type region and said third high concentration second conductive type region are arranged adjacent to each other.

17. (withdrawn) The electro-static discharge protection device according to claims 13, wherein said second high concentration second conductive type region and said third high concentration second conductive type region are arranged adjacent to each other.

18. (withdrawn) The electro-static discharge protection device according to claim 1, wherein a

width of said second high concentration second conductive type region is a minimum width where a contact can be formed in a permissible range of a design rule.

19. (withdrawn) The electro-static discharge protection device according to claim 2, wherein a width of said second high concentration second conductive type region is a minimum width where a contact can be formed in a permissible range of a design rule.

20. (withdrawn) The electro-static discharge protection device according to claim 12, wherein a width of said second high concentration second conductive type region is a minimum width where a contact can be formed in a permissible range of a design rule.

21. (withdrawn) The electro-static discharge protection device according to claim 13, wherein a width of said second high concentration second conductive type region is a minimum width where a contact can be formed in a permissible range of a design rule.

22. (withdrawn) An electro-static discharge protection device comprising: a P-type layer or a P-type substrate; an N well which is formed in a surface of said P-type layer or said P-type substrate; a first high concentration N-type region, a first high concentration P-type region and a second high concentration N-type region which are formed in a surface of said the N well; a third high concentration N-type region, a second high concentration P-type region and a third high concentration P-type region which are in the surface of said P-type substrate or said P-type layer; a first resistance element connected between said first high concentration P-type region and said second high concentration N-type region; and a second resistance element connected between

said second high concentration P-type region and said third high concentration P-type region. wherein said first high concentration N-type region and said first high concentration P-type region are connected with a first power supply of a potential, said third high concentration N-type region and said second high concentration P-type region are connected with a second power supply of a potential different from the potential of said first power supply, and said second high concentration N-type region is connected with a trigger current supply circuit.

23. (withdrawn) The electro-static discharge protection device according to claim 22, wherein said second high concentration N-type region and said third high concentration N-type region are arranged adjacent to each other.

24. (withdrawn) The electro-static discharge protection device according to claim 22, wherein said second high concentration N-type region has a minimum width where a contact can be formed in a permissible range of design rule.

25. (withdrawn) An electro-static discharge protection device comprising: a first conductive type layer or a first conductive type substrate; a first conductive type well and a second conductive type well which are arranged adjacent to each other in a surface of said first conductive type substrate or said first conductive type layer; a first high concentration first conductive type region, a second high concentration first conductive type region and a first high concentration second conductive type region which are formed in a surface of said second conductive type well; and a second high concentration second conductive type region and a third high concentration first conductive type region which are formed in a surface of said first

conductive type well, wherein said first high concentration second conductive type region and said first high concentration first conductive type region are connected with a first power supply of a potential, said second high concentration second conductive type region and said third high concentration first conductive type region are connected with a second power supply of a potential different from the potential of said first power supply, and said second high concentration first conductive type region is connected with a trigger current supply circuit.

26. (withdrawn) The electro-static discharge protection device according to claim 25, wherein said second high concentration first conductive type region and said second high concentration second conductive type region are arranged adjacent to each other.

27. (withdrawn) The electro-static discharge protection device according to claim 25, wherein each of said first high concentration second conductive type region and said first high concentration first conductive type region is separated into a plurality of divisional regions which are arranged into a direction orthogonal to a direction of arrangement of said first high concentration second conductive type region and said first high concentration first conductive type region, and said second high concentration first conductive type region extends between every two of division regions.

28. (withdrawn) The electro-static discharge protection device according to claim 27, wherein a portion of extending between said division regions has a minimum width such that a contact can be formed in a permissible range of design rule, and a portion of said second high concentration first conductive type region other than said extending portion has a width less than the minimum

width.

29. (original) An electro-static discharge protection device comprising: a first conductive type layer or a first conductive type substrate; a first conductive type well and a second conductive type well which are arranged adjacent to each other in a surface of said first conductive type substrate or said first conductive type layer; a first high concentration first conductive type region and a first high concentration second conductive type region which are formed in a surface of said second conductive type well; and a second high concentration first conductive type region and a second high concentration second conductive type region which are formed in a surface of said first conductive type well, wherein said first high concentration first conductive type region is connected with a first power supply of a potential; said second high concentration second conductive type region and said second high concentration first conductive type region are connected with a second power supply of a potential different from the potential of said first power supply, and said first high concentration second conductive type region is connected with a trigger current supply circuit.

30. (original) The electro-static discharge protection device according to claim 29, wherein said first high concentration second conductive type region and said second high concentration second conductive type region are arranged adjacent to each other.

31. (original) The electro-static discharge protection device according to claim 29, wherein said first high concentration second conductive type region has a minimum width such that a contact can be formed in a permissible range of design rule.

32. (original) The electro-static discharge protection device according to claim 29, wherein said first high concentration first conductive type region is separated into a plurality of divisional regions which are arranged in a direction orthogonal to a direction of arrangement of said second high concentration second conductive type region and said second high concentration first conductive type region, and said first high concentration second conductive type region extends between every two of said plurality of divisional regions.

33. (original) The electro-static discharge protection device according to claim 32, wherein the extending portion of said first high concentration first conductive type region has a minimum width such that a contact can be formed in a permissible range of design rule, and another portion of said first high concentration first conductive type region other than said extending portion has a width less than said minimum width.

34. (withdrawn) The electro-static discharge protection device according to claim 1, wherein a region where silicide is not formed is provided between said high concentration regions adjacent to each other.

35. (withdrawn) The electro-static discharge protection device according to claim 2, wherein a region where silicide is not formed is provided between said high concentration regions adjacent to each other.

36. (withdrawn) The electro-static discharge protection device according to claim 12, wherein a

region where silicide is not formed is provided between said high concentration regions adjacent to each other.

37. (withdrawn) The electro-static discharge protection device according to claim 13, wherein a region where silicide is not formed is provided between said high concentration regions adjacent to each other.

38. (withdrawn) The electro-static discharge protection device according to claim 22, wherein a region where silicide is not formed is provided between said high concentration regions adjacent to each other.

39. (withdrawn) The electro-static discharge protection device according to claim 25, wherein a region where silicide is not formed is provided between said high concentration regions adjacent to each other.

40. (original) The electro-static discharge protection device according to claim 29, wherein a region where silicide is not formed is provided between said high concentration regions adjacent to each other.

41. (withdrawn) The electro-static discharge protection device according to claim 1, wherein a gate electrode is provided between said high concentration regions adjacent to each other.

42. (withdrawn) The electro-static discharge protection device according to claim 2, wherein a

gate electrode is provided between said high concentration regions adjacent to each other.

43. (withdrawn) The electro-static discharge protection device according to claim 12, wherein a gate electrode is provided between said high concentration regions adjacent to each other.

44. (withdrawn) The electro-static discharge protection device according to claim 13, wherein a gate electrode is provided between said high concentration regions adjacent to each other.

45. (withdrawn) The electro-static discharge protection device according to claim 22, wherein a gate electrode is provided between said high concentration regions adjacent to each other.

46. (withdrawn) The electro-static discharge protection device according to claim 25, wherein a gate electrode is provided between said high concentration regions adjacent to each other.

47. (withdrawn) The electro-static discharge protection device according to claim 29, wherein a gate electrode is provided between said high concentration regions adjacent to each other.

48. (withdrawn) An electro-static discharge protection device comprising: a P-type layer or a P-type substrate; an N well which is formed in a surface of said P-type layer or said P-type substrate; a first high concentration N-type region and a first high concentration P-type region which are formed in a surface of said the N well; a second high concentration N-type region and a second high concentration P-type region and a third high concentration P-type region which are in the surface of said P-type substrate or said P-type layer; first and second resistance elements

connected between said first high concentration P-type region and said first high concentration N-type region; and third and fourth resistance elements connected between said second high concentration N-type region and a first predetermined potential, wherein a trigger current supply circuit is connected with a node between said first and second resistance elements and a said third and fourth resistance elements, said second high concentration N-type region and said third high concentration P-type region are connected with said first predetermined potential, and said first high concentration P-type region is connected with a second predetermined potential.

49. (withdrawn) The electro-static discharge protection device according to claim 48, wherein said second high concentration N-type region and said second high concentration P-type region are arranged adjacent to each other.

50. (withdrawn) The electro-static discharge protection device according to claim 48, wherein said first and third resistance elements are connected with said first high concentration P-type region and said first predetermined potential, and have resistance values lower than a resistance value of said N well and a resistance value of said P-type layer or said P-type substrate, respectively, and said second and fourth resistance elements are connected with said first high concentration N-type region and said second high concentration N-type region and resistance values of said second and fourth resistance elements are determined based on a desired hold voltage, respectively.

51. (withdrawn) The electro-static discharge protection device according to claim 48, wherein a region where silicide is not formed is provided between said high concentration regions adjacent

to each other.

52. (withdrawn) The electro-static discharge protection device according to claim 48, further comprising: a gate provided between every two of said high concentration regions, and wherein said high concentration regions are formed using said gates as a mask.

53. (new) An ESD protection circuit comprising:

a first bipolar transistor and a second bipolar transistor, said first and second bipolar transistors cooperating with one another to perform a SCR; and

a trigger device triggering said first and second bipolar transistors substantially simultaneously.

54. (new) The ESD protection circuit according to claim 53, wherein:

one end of said trigger device is connected to one of a collector and an emitter of said first bipolar transistor, and

another end of said trigger device is connected to one of a collector and an emitter of said second bipolar transistor.

55. (new) The ESD protection service according to claim 54, further comprising a first resistance element,

wherein said one end of said trigger device is connected to said one of said collector and said emitter of said first bipolar transistor via said first resistance element.

56 (new) The ESD protection circuit according to claim 55, further comprising a second resistance element,

wherein said another end of said trigger device is connected to a ground via said second resistance element.

57. (new) The ESD protection circuit according to claim 56, wherein said another end of said trigger device is connected to said one of said collector and said emitter of said second bipolar transistor via said second resistance element.

58. (new) The ESD protection circuit according to claim 54, wherein:

said one of said collector and said emitter of said first bipolar transistor is connected to a pad, and

said one of said collector and said emitter of said second bipolar transistor is connected to a ground.

59. (new) An ESD protection circuit comprising:

a first well of a first conductive type, said first well having a first region of said first conductive type and a second region of said second conductive type;

a second well of a second conductive type, said second well having a third region of said first conductive type and a fourth region of said second conductive type; and

a trigger device,

wherein said first well, second region and third region cooperate with each other to perform a first bipolar transistor;

said first well, said second well and said third region cooperate with each other to perform a second bipolar transistor;

said first and second bipolar transistors cooperate with one another to perform a SCR;
and

one end of said trigger device is connected to said first region, and another end of said trigger device is connected to said third region.

60. (new) The ESD protection circuit according to claim 59, further comprising:

a pad; and

a resistance element;

wherein said pad is connected to said first region via said resistance element; and

said one end of said trigger device is connected to said second region via said resistance element.

61. (new) The ESD protection circuit according to claim 59, further comprising a resistance element,

Wherein said another end of said trigger device is connected to said third region and a ground via said resistance element.

62. new) The ESD protection circuit according to claim 59, wherein said trigger device triggers said first and second bipolar transistors substantially simultaneously.

63. (new) The ESD protection circuit according to claim 59, wherein said first region and said second region are free from being intervened by insulating film therebetween.

64. (new) The ESD protection circuit according to claim 59, wherein said third region and said fourth region are free from being intervened by insulating film therebetween.